

**NAVAL WAR COLLEGE
Newport, R.I.**


**CHEMICAL AND BIOLOGICAL WARFARE:
IMPACT ON FORCE DEPLOYMENT**

By

**Sharon B. Campbell
Commander USN**

A paper submitted to the faculty of the Naval War College in partial satisfaction of the requirements of the Department of the Joint Military Operations.

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy.

Signature: 

**DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited**

17 May 1999

DTIC QUALITY INSPECTED 4

19991122 140

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority: NA			
3. Declassification/Downgrading Schedule: NA			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): CHEMICAL AND BIOLOGICAL WARFARE: IMPACT ON FORCE DEPLOYMENT (U)			
9. Personal Authors: CDR SHARON CAMPBELL, USN			
10. Type of Report: FINAL		11. Date of Report: 17 MAY 1999	
12. Page Count: 23			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: CHEMICAL/BIOLOGICAL WARFARE: HOST NATION SUPPORT, CIVILIANS, CONTRACTORS, FORCE DEPLOYMENT, STRATEGIC MOBILITY			
15. Abstract: One of the seven principles of logistics identified in Joint Pub 4-0 is survivability or the capacity to prevail in the face of potential destruction. Civilian personnel who make the force deployment system function are high pay-off targets subject to chemical and biological warfare (CBW). Disrupting or deterring the United States ability to deploy forces can seriously undermine the CINC's ability to prosecute the mission. Assured availability of critical host nation, civilian, and contractor personnel is a significant feature in designing a "survivable" force deployment system. Consequently, providing CBW protection should be a priority for the CINC. Operational Commanders are likely to see a growing reliance on host nation and contractor support particularly in the theater distribution process. Greater reliance does not come, however, without risks and costs. Vulnerabilities in our force deployment system due to our current dependence on a non-military workforce presents the operational commander with significant challenges and a need to understand the requirements to provide chemical and biological protection to our host nation and civilian personnel.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

ABSTRACT of

**CHEMICAL AND BIOLOGICAL WARFARE:
IMPACT ON FORCE DEPLOYMENT**

One of the seven principles of logistics identified in Joint Pub 4-0 is survivability or the capacity to prevail in the face of potential destruction. Civilian personnel who make the force deployment system function are high pay-off targets subject to chemical and biological warfare (CBW). Disrupting or deterring the United States ability to deploy forces can seriously undermine the CINC's ability to prosecute the mission. Assured availability of critical host nation, civilian, and contractor personnel is a significant feature in designing a "survivable" force deployment system. Consequently, providing CBW protection should be a priority for the CINC.

Operational Commanders are likely to see a growing reliance on host nation and contractor support particularly in the theater distribution process. Greater reliance does not come, however, without risks and costs. Vulnerabilities in our force deployment system due to our current dependence on a non-military workforce presents the operational commander with significant challenges and a need to understand the requirements to provide chemical and biological protection to our host nation and civilian personnel.

INTRODUCTION

My number one concern is strategic mobility.

*GEN Anthony Zinni, CDR, U.S. Central Command
Naval War College, 1999*

Thanks to CNN and the rest of the media, every military operation conducted by the United States is watched live by millions of viewers around the world. Included in the audience are potential adversaries hoping to identify a critical weakness in the United States military tool bag which could become a critical vulnerability open to attack. After the Gulf War, no lesson learned by a potential adversary was more important than the need to disrupt, or, if possible, prevent the deployment of U.S. forces and thus avoid a head-to-head, force on force confrontation.¹ The most cost effective and perhaps the most efficient strategy to avoid direct action would be to use asymmetric warfare against America's defense transportation system (DTS).² Asymmetric actions are especially effective when applied against a force being mobilized, in the process of deployment, or during an operational pause when they are in the process of regenerating their combat power.³ Chemical and biological warfare (CBW) are extremely potent examples of asymmetric weapons that can be utilized to disable U.S. strategic mobility. U.S. attempts to discourage the proliferation of such weapons have been unsuccessful resulting in the steady increase in the number of countries possessing or developing a chemical or biological weapons program.

The downsizing of the military force structure, and a reduction in forward basing has left the United States heavily dependent on deploying forces from the continental United States in times of conflict or crisis. Force deployment of U.S. based combat

forces encompasses five distinct phases: pre-deployment, movement to a port of embarkation, strategic movement, in-theater reception at a port of debarkation, and theater onward movement.⁴ Executing these five phases requires a large number of commercial assets and U.S. government civilian employees or civilian contractors who perform a myriad of functions. In addition, the United States ability to project power and sustain the force is contingent in many cases on the availability of host nation support.

A direct attack on large concentrations of U.S. military forces may be viewed as too difficult and costly, but an attack on the support infrastructure is less difficult and would impede the movement of U.S. forces. Host nation support and civilian employees could become a source of leverage easily exploited by an enemy using chemical or biological weapons. An opponent will have numerous opportunities during a force build-up or during prolonged operations to affect both civilian and host nation organizations. The neutralization, serious degradation, or destruction of these critical personnel will have a decisive impact on U.S. ability to accomplish a given military objective.⁵

In recent years, emphasis increased on training and equipping military forces to operate in a CBW environment. However, a 1996 Government Accounting Office study indicates that U.S. forces are still not prepared to survive and fight in a CBW environment. Early deploying units lack the necessary equipment, such as protective clothing, and chemical biological agent detectors. Personnel are not trained to existing standards and military medical capabilities to prevent and treat casualties on a contaminated battlefield are very limited. With CBW training and equipment shortfalls in the military community, it is no wonder that limited attention has been paid to protecting our force deployment personnel in a CBW environment.

This paper will examine vulnerabilities in our force deployment and sustainment system due to our current dependence on a non-military workforce and present operational commanders with a better understanding of the requirement to provide chemical and biological protection for our host nation and civilian staff.

FORCE DEPLOYMENT

Those who actually conduct deployments of operational forces like to remind us that amateurs talk about strategy while professionals talk about logistics.⁶ It is generally accepted that force deployment is perhaps the single most important stage in the planning and execution of any military action. Force deployment can be understood as a combination of movement and mobility aimed to bring one's own and friendly forces into the area where a crisis is occurring or combat action is planned.⁷ Strategic deployments (or inter-theater) which use the DTS and theater (or intra-theater) deployments are the two overarching components of force deployment.

Strategic Deployment

The defense transportation system is that portion of the nation's transportation infrastructure which supports Department of Defense (DOD) common user transportation needs across the range of military operations.⁸ U.S. Transportation Command (USTRANSCOM) is the DOD Single Manager for Transportation providing air, land, and sea assets to deploy, sustain, and redeploy the forces from origin to initial theater distribution points. USTRANSCOM has three subordinate component commands: Military Traffic Management Command (MTMC), Air Mobility Command (AMC), and Military Sealift Command (MSC).

MTMC is the single port manager providing terminal services and traffic management for common user seaports including operating ports assigned during contingency operations to ensure the timely flow of cargo and vessels. MTMC tracks and documents all cargo movements and provides personnel to stage and load or discharge vessel cargo. AMC provides strategic airlift assets to USTRANSCOM to support and sustain unit deployments. AMC is the single aerial port manager and can be assigned to operate common user airports worldwide. Aircraft are provided either from organic AMC inventory, chartered U.S. aircraft, the Civil Reserve Air Fleet (CRAF), coalition partners, or aircraft chartered from foreign countries. MSC provides strategic sealift for DOD cargo and U.S. forces. Vessels can be government owned, chartered from U.S. Flag commercial carriers, made available by coalition partners, or chartered from foreign countries. The crews of government owned and privately owned vessels are civilian mariners.

One common thread throughout these air, land, and sealift modes of transportation is the dependence on the commercial sector. During the Desert Shield deployment, the commercial sector conducted virtually all stateside surface movement. In the airlift mode, the commercial sector provided 64 percent of the passenger lift and 26 percent of the cargo tonnage. For sealift, the U.S. commercial liner fleet carried 29 percent of all sealift tonnage.⁹

With declining military budgets, the defense transportation system will continue to depend on a robust partnership with the commercial sector to meet force deployment and sustainment requirements.

Theater Deployment

USTRANSCOM is responsible for organizing and executing strategic movement into the theater while the last two phases, in-theater and onward movement, are the responsibility of the supported Commander-in-Chief (CINC). Once forces arrive at an

in-theater aerial or seaport of debarkation, strategic lift ends and theater movement begins.

Theater deployment is planned and conducted to move a military force from the current area of operations in order to obtain a position to start operational maneuver before commencement of a major operation.¹⁰ Theater transportation networks include the ports, bases, airports, rail heads, pipeline terminals, and trailer transfer points that serve as the reception and transshipment points for the routes along which supplies and military forces move.¹¹ A significant numbers of civilian personnel are necessary to operate the theater transportation networks.

Host Nation Support

Required to reduce force structure, the military has allocated an increasingly large amount of manpower and funding to maintain active duty combat units which in turn has resulted in a reduction in availability of active duty logistics support. Host nation support (HNS) has become the stopgap to meet critical logistic manpower shortfalls. Previously, commanders relied on host nation support only during the sustainment phase to augment military equipment and personnel. Host nation support is now an integral part of every CINC's deployment plan, which is used to maximize the limited strategic lift and reduce the amount of supplies and equipment required to move into theatre. Host nation support is only limited by the resources each host country will make available. Bilateral agreements between countries are used to document the anticipated support; however, these agreements are very broad and are not contractually binding.

*Host nation support arrangements may include: operation, maintenance and security of sea and airports. Construction and management of routes, railways and inland waterways; provision of medical service support, subsistence support, petroleum pipelines and bulk storage, warehouse or other facilities; logistics civil augmentation programs; and operations of existing communications networks. Host nation support could also include transportation, civilian labor and local security and police forces.*¹²

Host nation support is especially critical during the reception, staging, onward movement, and integration of forces into theater. As strategic lift arrives in theater, host nation personnel conduct discharge operations, move the equipment into staging areas for documentation and tracking, assist in moving the equipment forward to assembly areas and integrate the equipment with its assigned unit personnel.

During Operations Desert Shield and Desert Storm, the United States arranged for Saudi Arabian host nation support in port operations, subsistence (over 20 million meals), water, facilities and shelter (over 500 tents), communications, and over one million gallons of packaged products. Fuel, the lifeblood of a mechanized force, was provided by the host nation and distributed using 2500 commercial fuel tankers and drivers.¹³ Third country nationals were hired as stevedores, crane operators, and vehicle drivers in the seaports of debarkation.

The weak link in theater logistics is the capability to move supplies from the main operating bases forward.¹⁴ Desert Storm host nation support gave the theater combatant commander the flexibility to extend his operational reach or the range to which a commander can mass and employ forces decisively. The length, efficiency, and security of the lines of communication (LOC) influence operational reach.¹⁵ Army doctrine is designed for a 90 mile LOC from main supply bases and the Marine Corps only 30 miles. With the assistance of Saudi HNS, this distance stretched to 350 miles and ultimately 600 miles from the main supply bases.¹⁶

In the Korean Theater, an important piece of the host nation support comes in the form of the Korean Service Corps (KSC). Begun during the Korean War to provide civilian carriers to haul supplies to the U.S. front line, the program continues today providing U.S. Eighth Army immediate combat service support in the first days of hostilities. KSC civilians hold down 40-hour a week jobs and are engaged in battle task training to prepare them for mobilization.¹⁷ During hostilities, KSC civilians mobilize to fill a plethora of critical support positions including operating the ports and airfields, transshipping ammunition and fuel, and maintaining the roads.

These examples point to a continued reliance on host nation support to generate combat power and define the limits of a major operation.¹⁸ Logisticians in the future will work more closely with their host nation counterparts than previously. Host nation support will expand by degree, but also in kind as the United States pushes for greater international "cost sharing".¹⁹

Contractor Support

So significant was the civilian contribution to Operations Desert Shield and Desert Storm that some officials say many service members may owe their lives to Army civilians who helped maintain equipment and sped up the process of getting parts and other support from 60 logistics agencies at Army installations worldwide.²⁰

Civilian contractors on the battlefield have been documented throughout military history. They provide substantial combat service support and combat support. System contractors and contingency contractors are the two types of contractors generally used to support military operations. System contractors provide support to specific weapons

systems or to a specified set of components.²¹ As an example, more than 1000 civilians set up a major depot operation in the Persian Gulf to conduct the M-1A1 rollover mission at the port of Damman, where units exchanged their M-1 Abrams tanks for the improved M-1A1 models.²² Contingency contractors provide a variety of support primarily in the form of general logistics services. Contingency contracts will be pre-arranged under the Logistics Civil Augmentation Program (LOGCAP) or can be negotiated for specific items during pre-deployment and deployment activities.²³

LOGCAP provides logistical and engineering support by contractors who are authorized to acquire goods and services worldwide and therefore are not constrained by host nation support. LOGCAP contracts are normally for a five-year period allowing military personnel the ability to interface and develop relationships with contractors before the start of a crisis. How the contractor will provide support is delineated in the form of Program Concept Plans known as Generic Capabilities Plans or Specified Capabilities Plans.

Multinational Force operations in Haiti in 1994 and 1995 are a perfect example of the benefit of LOGCAP services. The transportation infrastructure in Haiti is one of the worst in the Western Hemisphere and will not generally support sustainment and resupply requirements. Host Nation support provided only limited commercial bus assets. The LOGCAP contractor provided the lions share of transportation support for the Multinational Force.²⁴ In addition, they were the single source of JP5 fuel storage and distribution. Although the LOGCAP contractor is relatively expensive, the reciprocal effect is that an active military combat support command is free to deploy elsewhere.²⁵

Because U.S. military forces will likely operate within relatively narrow budgetary guidelines, privatization of many support services within the armed forces is likely to expand. Privatization also reduces the size of any troop commitment, rendering an operation more palatable in the public eye, and thus facilitating the continuance of public support.²⁶

OPERATIONAL FIRES

The Chief of the United States Chemical Warfare Service writing in 1946 calculated the use of gas by the Germans against the Normandy beach-heads "might have delayed our invasion another six months".²⁷

Operational fires can be understood as the application of firepower to achieve a decisive impact on the conduct of an operation or campaign. Operational fires can be either lethal or non-lethal. Weapons of mass destruction are considered lethal operational fires intended to delay, disrupt, destroy, or degrade the enemy forces or critical functions and facilities. Non-lethal fires are intended to impair, disrupt, or delay the performance of enemy operational forces, functions and facilities. Psychological operations are an example of non-lethal fires.²⁸

Chemical and biological warfare can be used as operational fires to isolate the battlefield, destroy enemy principle forces and facilities, disrupt or cut off enemy's logistical support and sustainment, and prevent enemy forces leaving the theater. CBW attacks will disrupt and confuse the timing, sequencing, and effectiveness of force deployment. Chemical and biological weapons can be very effective used in a non-lethal form. During WWI the mortality rate for chemical weapons was only 1.5 percent, leaving 98% of the affected personnel as casualties. The severity of the effects was

enough to keep a man away from duty for two or three months or longer. In addition, a chemical casualty is much like the man wounded by a sniper, it takes two others to tend to him.²⁹ Non-lethal biological weapons are quickly becoming the weapons of choice due to their low cost, ease of production and storage, and ease of distribution. An adversary may use non-lethal biological weapons to gain their objectives by temporarily incapacitating U.S. or allied forces in an effort to deny use of essential seaports and airfields.

An operational fire could become a strategic fire if it is designed to have a major impact on the course and outcome of a campaign or in some cases even a war as a whole.³⁰ A theater-strategic commander may determine that the only way to achieve a limited objective is to delay United States involvement. Recognizing the American people's aversion to casualties and not wanting to arouse the public ire, the enemy commander can use non-lethal biological agents to minimize casualties while achieving the objective. For example, a non-lethal biological agent could be introduced to make civilian strategic airlift or sealift crews ill. By the time U.S. forces could recover and arrive in theater, victory would have been claimed and the opponent would be suing for peace. The options for massive retaliation would be limited, as it is doubtful that most Americans would support a nuclear attack over a flu outbreak.³¹

The effects of weapons of mass destruction on a campaign or major operation, either through their use or the threat of their use can cause large-scale shifts in objectives, phases, and courses of action. Thus planning for the possibility of their use against friendly forces is critical to campaign design.³²

VULNERABILITIES

The significant dependence on non-military personnel provides a major benefit to the U.S. taxpayer. It reduces the cost of a peacetime defense transportation system, while providing the surge capability needed during a major crisis. Nevertheless, this dependence on civilians could become the Achilles heel of America's military might.³³

The CINC's are likely to see a growing reliance on host nation and contractor support particularly in the theater distribution process. Greater reliance does not come, however, without risks and costs. Personnel operating in or near ports, airfields, or storage sites holding prepositioned supplies are subject to chemical or biological attack. Direct attacks aimed at logistics choke points could bring force deployment to a crawl. During Operations Desert Shield and Desert Storm, five airfields in the Persian Gulf handled 80% of the cargo and personnel airlifted while one port in Saudi Arabia handled 86% of cargo delivered by sea. A successful direct attack at one of these choke points would have hampered the force build up. The threat of a direct attack may force a CINC to change a deployment plan midstream in order to disperse the forces and lessen the threat. However, dispersal in some areas of the world would be very difficult due to the lack of suitable alternative ports and lack of host nation support.

If HNS is disrupted, the U.S. may be forced to bring its own supplies escalating the demand for limited sealift assets and increasing the amount of cargo passing through the ports. An attack on an airfield can upset the synchronization needed to marry up unit personnel arriving by air with their equipment arriving by sea causing more cargo to be stranded at the pier. Massing equipment and large groups of personnel increases the likelihood of direct enemy attack.

A potentially more difficult problem to combat is the psychological impact of CBW. CBW can be used as an indirect threat aimed at paralyzing people not trained or equipped to function in this environment. During Desert Storm, after each SCUD missile attack, host nation support decreased because many civilians refused to return to work. Further, many host nation workers proved unreliable and uncontrollable. Host nation drivers frequently quit working and units had to find U.S. drivers to replace them.³⁴ With this history, many questions are left unanswered. If the SCUD missiles had carried chemical or biological agents, would any of the civilians returned to work? Would civilian contractors return to work in a contaminated area that has been declared decontaminated? Would union employees onboard aircraft or vessels remain at their posts?

The United States routinely requests access to host nation facilities to aid in force deployment. Launching an attack may not even be necessary. Simply threatening to attack if host nation personnel come to work would be a strong deterrent particularly in countries whose vital interests are not at stake. Nations who are simply providing logistical assistance may deny the United States access. With the increased range of CBW delivery systems, it could become very difficult to find a country willing to grant access. The impact would be to severely lengthen lines of communication.

Vulnerabilities in the force deployment system are not limited to the theater of operations. The United States is vulnerable to CBW attack. Non-lethal agents could be introduced at U.S. transportation nodes to delay force deployment. All cargo and personnel must travel from point of origin to air or sea ports of embarkation making the U.S. highway system susceptible to attack. Although several U.S. corporations are taking

an active look at this issue, the current government homeland defense plan does not address chemical or biological defense.

Relying on a civilian logistics infrastructure also degrades force protection capabilities. Most military personnel are classified as combatants and can be relied upon to assist and augment the fighting force, as well as provide self-protection and defend equipment and terrain. Logisticians always have been the "infantry in reserve" and in many cases, they have provided force protection for rear area headquarters and lines of communication.³⁵ The loss of military force structure not only decreases the CINC's operational flexibility but also increases his force protection responsibilities.

CONCLUSIONS AND RECOMMENDATIONS

One of the seven principles of logistics identified in Joint Pub 4-0 is survivability or the capacity to prevail in the face of potential destruction. Civilian personnel who make the force deployment system function are high pay-off targets subject to chemical and biological warfare. Disrupting or deterring the United States ability to deploy forces can seriously undermine the CINC's ability to prosecute the mission. Assured availability of critical host nation, civilian, and contractor personnel is a significant feature in designing a "survivable" force deployment system. Consequently, providing CBW protection should be a priority for the CINC.

Joint Pub 3-11 assigns the CINC responsibility for coordinating chemical and biological defense with the host nation. Contractor force protection derives from three factors: a legal responsibility for the government to provide a safe workplace, a responsibility that is stipulated in most contracts, and a practical responsibility to help

them do their jobs. Force protection must be part of the deliberate plan and include the flexibility to respond to a situation as it develops.³⁶

Joint doctrine assigning specific responsibilities for CBW protection of critical personnel needs to be developed. It is easy for the CINC's to rely on Title 10 of the United States Code which requires each Service component to train and supply its own forces. However, uncoordinated Service efforts will result in duplication of effort and misapplication of scarce resources. To help prevent this, the CINC can identify critical personnel in his theater and ensure no one falls through the cracks.

Each theater has unique requirements that only a CINC is capable of addressing. One DOD Service-wide policy will not be successful. Southwest Asia host nation support is comprised of a large number of third country nationals. In addition, the U.S. does not have a permanent presence in most of our contingency ports. Providing advance protective clothing and training would not be effective in this theater due to the mobile workforce and a lack of dedicated assets to monitor the program. Southwest Asia would benefit from an *exportable program*, which would be activated before hostilities. CBW trainers would be available to respond to the CINC's request and protective suits would be issued at that time.

On the other hand, the Korean Theater is an established theater possessing logistics support staff who are part of the Korean Service Corps or who mobilize in place. The U.S. maintains a large permanent presence in the major ports and airfields. The Korean Theater would benefit from a *sustainable program* since there is a stable workforce. Protective gear could be issued in advance and regular training could be conducted. The MTMC Office in Korea has taken the lead on establishing a sustainable

program and has been authorized to include CBW training in their host nation contracts. Korean staffs are also part of their port defense plans. However, MTMC does not have the funds to maintain protective clothing nor the expertise on staff to provide the detailed training. Funding and staffing from the CINC for the training and equipping of personnel should be provided.

It should be noted that not all host nation personnel will agree to participate in CBW training. When the MSC Office in Korea initiated CBW training in 1997, several of the 30-year employees became very upset. They remembered the Pusan Perimeter during the Korean War and always felt Pusan would remain a safe haven. The realization that they and their families now live in harms' way was quite eye opening.

Passive defense measures should also be provided to coalition partners for high value logistics nodes. Early warning systems coupled with detection capabilities and chemical protective shelters will go a long way in maintaining host nation confidence and support. High value nodes in the United States should also be identified and provided passive defense capabilities. Once deployment begins, public affairs, civil affairs, and psyops should be used to reduce confusion and fear.

The CINC's should examine the current AMC initiative to identify transfer bases where civilian aircraft would land enroute and transfer cargo to military air. Transfer bases reduce the exposure of civilian personnel and aircraft to CBW. Seaports suitable to use as transfer bases for civilian sealift should be identified.

Each CINC should examine the applicability of seabased logistics to their theater and determine if the concept could be expanded to support a larger military force. Seabased logistics enables the logistics footprint on shore to be reduced by maintaining

supplies at sea. Moving the logistics tail offshore may reduce the likelihood of contamination.

Finally, the CINC's should request Army Reserve logistics personnel and chemical decontamination units be moved up on the deployment schedule. If critical personnel are not available or are unwilling to complete their mission, the CINC must have a fall back game plan.

Complacency and the absence of command emphasis on CBW protection before deployment will result in equipment, training, and medical shortages producing needless casualties and degradation in our warfighting capability.

NOTES

- ¹ Randall J. Larsen and Robert Kadlec, "Biological Warfare: A Silent Threat to America's Defense Transportation System," Strategic Review, Spring 1998, 5.
- ² Ibid., 6.
- ³ Milan Vego, On Operational Art (third draft) (U.S. Naval War College, Newport, RI 1998), 302.
- ⁴ Milan Vego, "Force Deployment in U.S. Joint Doctrine and Practice," (Unpublished Joint Military Operations Department Paper, U.S. Naval War College, Newport, RI:1998), 4.
- ⁵ Milan Vego, On Operational Art (third draft) (U.S. Naval War College, Newport, RI 1998), 133.
- ⁶ Kenneth Allard, Somalia Operations: Lessons Learned (Ft. McNair, Washington, DC:National Defense University Press 1995), 44.
- ⁷ Milan Vego, "Force Deployment in U.S. Joint Doctrine and Practice," (Unpublished Joint Military Operations Department Paper, U.S. Naval War College, Newport, RI:1998), 1.
- ⁸ Joint Chiefs of Staff, Joint Doctrine for the Defense Transportation System (Joint Pub 4-01) (Washington, DC: June 17, 1997), I-1.
- ⁹ Ronald R. Fogleman, "Balanced Surface, Airlift, Sealift," Defense 94, No.6, 1994, 39.
- ¹⁰ Milan Vego, "Force Deployment in U.S. Joint Doctrine and Practice," (Unpublished Joint Military Operations Department Paper, U.S. Naval War College, Newport, RI:1998), 2.
- ¹¹ Joint Chiefs of Staff, Joint Doctrine for Logistic Support of Joint Operations (Joint Pub 4-0) (Washington, DC: January 27, 1995), IV-2.
- ¹² Nathan J. Power, "Force Projection Logistics," Military Review, July 1993, 48.
- ¹³ Anthony H. Kral, "Host Nation Support and Civilian Contracting: Don't Try Fighting Without It," (Unpublished Research Paper, School of Advanced Military Studies, FT. Leavenworth, Kansas:1992), 28-30.
- ¹⁴ Robert W. Ralston, "Operational Logistics/role for the future?" (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1994), 24.
- ¹⁵ Joint Chiefs of Staff, Joint Doctrine for Logistic Support of Joint Operations (Joint Pub 4-0) (Washington, DC: January 27, 1995), IV-6.
- ¹⁶ Robert W. Ralston, "Operational Logistics/role for the future?" (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1994), 17.
- ¹⁷ Russell L. Prewittcampbell, "The Korean Service Corps: Eighth Army's Three Dimensional Asset," Army Logistician, Mar-Apr 1999, <<http://www.almc.army.mil/orgnzatn/alog/>>(04 May 1999).
- ¹⁸ Robert W. Ralston, "Operational Logistics/role for the future?" (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1994), 30.

- ¹⁹ Stephen P. Ferris and David M. Keithly, "21st-Century Logistics: Joint Ties That Bind," Parameters, Autumn 1997, 43.
- ²⁰ Elroy Garcia, "Storm Civilians," Soldiers, August 1991, 10.
- ²¹ Joe A. Fortner and Ron Jaeckle, Institutionalizing Contractors on the Battlefield," Army Logistician, Nov-Dec 1998, <<http://www.almc.army.mil/orgnzatn/alog/>>(04 May 1999).
- ²² Elroy Garcia, "Storm Civilians," Soldiers, August 1991, 11.
- ²³ Joe A. Fortner and Ron Jaeckle, Institutionalizing Contractors on the Battlefield," Army Logistician, Nov-Dec 1998, <<http://www.almc.army.mil/orgnzatn/alog/>>(04 May 1999).
- ²⁴ U.S. Army Training and Doctrine Command, Initial Impressions Volume III Haiti, July 1995, Center for Army Lessons Learned, , FT Leavenworth, KS, 195.
- ²⁵ Ibid, 174.
- ²⁶ Stephen P. Ferris and David M. Keithly, "21st-Century Logistics: Joint Ties That Bind," Parameters, Autumn 1997, 43.
- ²⁷ James M. Murphy, "From the Sea: Chemical and Biological Concerns," (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1994), 12.
- ²⁸ Milan Vego, On Operational Art (third draft) (U.S. Naval War College, Newport, RI:1998), 197.
- ²⁹ James M. Murphy, "From the Sea: Chemical and Biological Concerns," (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1994), 17.
- ³⁰ Milan Vego, On Operational Art (third draft) (U.S. Naval War College, Newport, RI:1998), 195.
- ³¹ Randall J. Larsen and Robert Kadlec, "Biological Warfare: A Silent Threat to America's Defense Transportation System," Strategic Review, Spring 1998, 8.
- ³² James M. Murphy, "From the Sea: Chemical and Biological Concerns," (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1994), 6.
- ³³ Randall J. Larsen and Robert Kadlec, "Biological Warfare: A Silent Threat to America's Defense Transportation System," Strategic Review, Spring 1998, 7.
- ³⁴ Anthony H. Kral, "Host Nation Support and Civilian Contracting: Don't Try Fighting Without It," (Unpublished Research Paper, School of Advanced Military Studies, FT. Leavenworth, Kansas:1992), 29.
- ³⁵ Eric A. Orsini and Gary T. Bublitz, "Contractors on the Battlefield: Risks on the Road Ahead?," Army Logisitcian, Jan-Feb 1999, <<http://www.almc.army.mil/orgnzatn/alog/>> (4 May 1999).
- ³⁶ David M. Young , "Operational Planning for Contractors on the Battlefield," (Unpublished Research Paper, U.S. Naval War College, Newport, RI:1998), 6.

BIBLIOGRAPHY

- Allard, Kenneth. Somalia Operations: Lessons Learned. National Defense University Press, Ft McNair, Washington, DC: 1995.
- Althouse, James E. "Contractors on the Battlefield." Army Logistician. Nov-Dec 1998. <<http://www/almc.army.mil/orgnzatn/alog/>>(04 May 99).
- Ackley, Richard T. "Sealift and National Security." Proceedings, July 1992, 41-47.
- Black, Bruce A. "Country-to-Country Agreements: The Logisticians Cost Challenge." Army Logistician, Mar-Apr 1990. 26-29.
- Bradley, Neal H. "The Continuing Need for Reinforcement and Sustainment." Army Logistician. Mar-Apr 1991. 29-31.
- Chow, Brian G. Documented Briefing: Air Operations in a Chemical and Biological Environment. Santa Monica, CA: The Rand Corporation, 1998.
- Cochran, Douglas R. "Force Protection Doctrine: An Operational Necessity." Unpublished Research Paper, U.S. Naval War College, Newport. RI: 1998.
- Coston, O.L. "The Threat of Chemical Warfare to Shore Facilities." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1984.
- Dulin, Patrick J. "Logistics Vulnerabilities in the Future." Army Logistician. Nov-Dec 1998. <<http://www/almc.army.mil/orgnzatn/alog/>>(04 May 99).
- Ferris, Stephen P. and Keithly, David M. "21st Century Logistics: Joint Ties That Bind." Parameters, Autumn 1997. 38-49.
- Fogleman, Ronald R. "Balanced Surface, Airlift, Sealift." Defense 94, No. 6, 35-50.
- Fortner, Joe A. and Jaeckle, Ron. "Institutionalizing Contractors On The Battlefield." Army Logistician. Nov-Dec 1998. <<http://www/almc.army.mil/orgnzatn/alog/>>(04 May 99).
- Garcia, Elroy. "Storm Civilians." Soldiers, August 1991. 10-12.
- Gourdin, Kent N. and Clarke, Richard L. "Winning Transportation Partnerships: Learning From The Desert Storm Experience." Transportation Journal, Fall 1992, 30-37.

- Harrison, William J. "Weapons Proliferation and Its Impact on "Forward...From the Sea." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1999.
- Johnson, William F. "Operational Logistics for OCONUS Consequence Management: A Joint-Interagency Challenge." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1998.
- Joseph, Robert G. "The Impact of NBC Proliferation on Doctrine and Operation." Joint Forces Quarterly, Autumn 1996, 74-80.
- Kral, Anthony H. "Host Nation Support and Civilian Contracting: Don't Try Fighting Without It." Unpublished Research Paper, School of Advanced Military Studies, Fort Leavenworth, KS: 1992.
- Kross, Walter. "Single Port Management." Joint Forces Quarterly, Winter 1996-97, 53-57.
- Larsen, Randall J. and Kadlec, Robert P. "Biological Warfare: A Silent Threat to America's Defense Transportation System." Strategic Review, Spring 1998. 6-10.
- Larsen, Randall W. "Biological Warfare in the Littorals." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1997.
- Larson, William J. "Chemical and Biological Weapons: A Growing Problem for the CINC." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1997.
- Lund, Ruth and others. Project Air Force: An Assessment of Strategic Airlift Operational Efficiency. Santa Monica, CA: The Rand Corporation, 1993.
- Military Traffic Management Command. Nuclear, Biological and Chemical Defense Plan. Falls Church, VA: 1998.
- Murphy, James M. "...From the Sea: Chemical and Biological Concerns." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1994.
- Orsini, Eric A. and Bublitz, Gary T. "Contractors on the Battlefield: Risks on the Road Ahead." Army Logistician. Jan-Feb 1999. <<http://www/almc.army.mil/orgnzatn/alog/>>(04 May 99).
- Prewittcampbell Russell L. "The Korean Service Corps: Eight Armys Three Dimensional Asset." Army Logistician. Mar-Apr 1999. <<http://www/almc.army.mil/orgnzatn/alog/>>(04 May 99).
- Power, Nathan J. "Force Projection Logistics." Military Review, July 1993.

Ralston, Robert W. "Operational Logistics/Role For the Future." Unpublished Research Paper, U.S. Naval War College, Newport, RI: 1994.

Rhodes, J.E. and Holder, G.S. "Seabased Logistics: A 21st Century Warfighting Concept." Joint Military Operations Department, U.S. Naval War College, Newport, RI: May 1998.

U.S. General Accounting Office. Chemical and Biological Defense: Emphasis Remains Insufficient to Resolve Continuing Problems. Letter Report to Congress. Washington, D.C.: 1996.

U.S. Joint Chiefs of Staff. Joint Doctrine For The Defense Transportation System (Joint Pub 4-01) Washington, D.C.: June 17, 1997.

U.S. Joint Chiefs of Staff. Doctrine for Logistic Support of Joint Operations (Joint Pub 4-0) Washington, D.C.: January 27, 1995.

U.S. Army Training and Doctrine Command. "Report: Initial Impressions Volume III, Haiti, July 1995." The U.S. Army and United Nations Peacekeeping Center for Army Lessons Learned, Ft Leavenworth, KS.

Vego, Milan. On Operational Art (third draft). U.S. Naval War College, Newport, RI: 1998.

Vego, Milo. "Force Deployment In U.S. Joint Doctrine and Practice." Joint Military Operations Department, U.S. Naval War College, Newport, RI: April 1998.

Williams, Thomas J. "The Canvass and the Clock...Impact of Logistics at the Operational Level of War." Unpublished Research Paper, U.S. Naval War College, Newport, RI: May 1993.

Woods, Michelle L. "Logistics Civil Augmentation Program (LogCap) and the Operational Commander." Unpublished Research Paper, U.S. Naval War College, Newport, RI: Feb 1998.

Young, David L. "Planning: The Key to Contractors on the Battlefield." Army Logistician. May-Jun 1999. <<http://www/almc.army.mil/orgnzatn/alog/>>(04 May 99).